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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/657,063	09/03/2003	Herman Leonard Offerhaus	30394-1102	8825

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EXAMINER	
CHANG, AUDREY Y	
ART UNIT	PAPER NUMBER
2872	

DATE MAILED: 12/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/657,063	OFFERHAUS, HERMAN LEONARD	
	Examiner	Art Unit	
	Audrey Y. Chang	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 October 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Remark

- This Office Action is in response to applicant's amendment filed on October 4, 2004, which has been entered into the file.
- By this amendment, the applicant has amended claims 1-4.
- Claims 1-4 remain pending in this application.
- The rejections to claims 1-2 under 35 USC 112, first paragraph, set forth in the previous Office Action still holds, and they are explained as follows. The rejections to claims under 35 USC 112, second paragraph, set forth in the previous Office Action are *withdrawn* in response to the amendment.

Information Disclosure Statement

1. The information disclosure statement filed September 3, 2003 fails to comply with 37 CFR 1.98(a)(3) because it does not include a concise explanation of the relevance, as it is presently understood by the individual designated in 37 CFR 1.56(c) most knowledgeable about the content of the information, of each patent listed that is not in the English language. It has been placed in the application file, but the information referred to therein has not been considered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. **Claims 1-2 are rejected under 35 U.S.C. 112, first paragraph**, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was **not** described in the

specification in such a way as to **enable** one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claims 1-2 have been amended wherein the amendments necessities further rejections to the claims.

The specification and the claims fail to teach how could a coherent laser beam be generated by using a series of laser diodes, a hologram and a mirror for reflecting "some of the secondary coherent light emission" back to the diodes, as recited in claims 1 and 2. Certain kind of phase-locking or mode-locking for the laser diodes seems to be needed in order to achieve such feature. The claims only recite a *hologram* is used to generate the coherent laser beam, namely the secondary coherent light emission, wherein the hologram is actually a *recording* of the *interference pattern* of the primary light emission from the series of diode lasers and **the** *secondary* coherent light emission. It is not clear if the secondary coherent light emission is the coherent laser light *intended to be generated* by the apparatus, using the hologram, then where does this coherent laser light come from to record the hologram at first place? The specification and the claims further **fail** to teach how could the "some of said secondary coherent light emission via the hologram to diode lasers so as to *act* as a *feedback* signal to secure phase-locking". The specification fails to teach how could the so-called "feedback signal" is capable of phase lucking and phase lucking of what? The applicant is respectfully noted that critical and essential features are necessary to be included in the claims to make the claims operable.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Roess (PN. 3,763,441) in view of the patent issued to European Patent Application (EP 0 176 329) by Ritter et al.

Roess teaches a device for *phase-synchronization* of *several laser oscillators* wherein the device comprises a *plurality of laser diodes* (1 and 2 in Figure 1), serves as the *diode array*, which generate a *first primary light emission* incidents on a *hologram* (5), serves as the *system for transforming* the primary light emission into a *secondary coherent* light emission that is then directed to a *mirror* (6). The mirror reflects some of the secondary light emission to make it passes through the hologram and to generate *tertiary light emission* back toward the *plurality of laser diodes*, which serves as *the feedback signal for the diode lasers,* (please see column 2, lines 15-62). Roess teaches that the hologram superposes the primary emission from all of the laser diodes to form a *single* summation wave which is *coherent* and phase-synchronized, (please see column 2, lines 23-27). The hologram contains an *interference* pattern that is created by the *interference* between the a *spherical wave* and a *series of spherical waves that generated from the plurality of laser diodes*. From the standard knowledge of holographic art, the secondary coherent light emission, when reflected from the mirror (6) will act as reconstructing light beam to play back the tertiary light emission that is conjugated to the primary light emission. The tertiary light emission will act as the *feedback* signal to induce emission in the laser diodes. This implies the light wave used to generate the hologram is the primary and secondary light emission.

This reference has met all the limitations of the claims with the exception that it does not teach explicitly that the hologram is of a *reflection* mode. However to make the hologram either of reflection mode or transmission mode does not change the essential operation of the device and the none-critical differences between the two modes is the geometric arrangement of the device. **Ritter** et al in the same field of endeavor does teach explicitly to use a *reflective holographic grating* (70, Figure 5) for reflecting back the feedback signal directly from the reflective hologram to modulate the laser diode source. It

would then have been obvious to one skilled in the art to apply the teachings of Ritter et al to modify the arrangement of the device of Roess to accommodate a reflective hologram instead of a transmissive hologram for the benefit of reducing the size and the number of elements used in the device.

6. **Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Roess in view of the patent issued to Psaltis et al (PN. 5,959,747).**

Roess teaches a device for *phase-synchronization* of several *laser oscillators* wherein the device comprises a *plurality of laser diodes* (1 and 2 in Figure 1), that generate a *first primary light emission* incidents on a *hologram* (5), serves as the *system* for *transforming* the primary light emission into a *secondary coherent light emission* that is then directed to a mirror (6). The mirror then reflects some of the secondary light emission back through the hologram and generates *tertiary light emission* toward the plurality of laser diodes that serves as the feedback signal for the diode lasers, (please see column 2, lines 15-62). Roess teaches that the hologram superposes the primary emission from all of the laser diodes to form a *single* summation wave which is *coherent* and phase-synchronized, (please see column 2, lines 23-27). The hologram contains an *interference* pattern that is created by the *interference* between the a spherical wave, serves as the *reference signal,* and a series of spherical waves that are generated from the plurality of laser diodes, which is the primary light emission. It is implicitly true that the hologram is formed in a *recording medium* that is *transparent* or *partially permeable.* The primary light emission that includes the light waves generated from the plurality of laser diodes is diffracted by the hologram wherein the diffracted beam, or the secondary light emission is reflected by the reflector (6) and the reflected light acts as a reconstructing light that illuminates the hologram to create a light emission that is phase-conjugated to the primary emission and serves as the feedback signal to the laser diodes.

This reference has met all the limitations of the claims with the exception that it does not teach to use a self-pumped photorefractive crystal as an alternative means to modulate the primary light emission

to create a light emission that is phase-conjugated to the primary light emission to serves as the feedback signal. However using self-pumped photorefractive crystal as phase conjugator to create conjugated light beam in holographic art is rather well known. **Psaltis** et al teaches **explicitly** that a *self-pumped photorefractive crystal* $BaTiO_3$ is used as the phase conjugator (332, Figure 3b) such that a reference light beam (320) passes through the hologram recording medium (302) is directed to the phase-conjugator wherein a *phase-conjugated beam* (321) is *returned* by the conjugator back to the hologram recording medium, (please see column 8, lines 12-42). It would then have been obvious to one skilled in the art to modify the device of Roess to use a self-pumped photorefractive crystal as an alternative means for the phase conjugator to generate the phase conjugated primary emission as the feedback signal for the laser diodes. With regard to claim 4, Psaltis et al teaches that a lens (334) is used to focus the light (320) to the photorefractive crystal.

Response to Arguments

7. Applicant's arguments filed on October 4, 2004 have been fully considered but they are not persuasive.

8. In response to applicant's arguments, which states that the cited Roess reference discloses only applies *single* diodes which shows a *typical* interference pattern based on *predictable* behavior of the single diodes, the examiner respectfully disagrees and wishes to point out to the applicant that Roess teaches **explicitly** that the hologram (5) can be operated for "a *random number* of laser oscillators" and a near 100 percent efficiency can be achieved for a *large variety types of laser oscillators* to achieve phase synchronization, (please see column 2, lines 62-69). This means the hologram (5) must include the recording of interference pattern that is *capable* of making *a plurality of laser diodes or oscillators and a variety types of them to achieve phase synchronization.* Roess therefore does not teach to use a *single* diodes. Furthermore, applicant's arguments, which state that the laser diodes used by Roess has

predicable phase and frequency where the laser diodes used in the instant application has *unpredictable* phase and frequency, cannot be reasonably ascertained. It is not clear how can the applicant make such assertion, since both the cited Roess reference and the instant application teach the same limitations namely a *plurality of laser diodes forming an array.* Why the laser diodes in the instant application will have so different properties and "supporting high power laser" while the cited reference will not. The applicant fails to give support for such statement. Cited Roess reference teaches *explicitly* that "a large variety types of laser oscillators" can be used which implicitly includes laser diodes with different frequency and phase.

9. In response to applicant's arguments concerning claims 3 and 4 with regard to the cited Roess reference, the various features, such as *initial phase locking, self-organizing holographic phase-conjugating reflector, locking diodes through feedback of the photo refractive crystal* etc. are NOT limitations in the claims which therefore cannot be relied upon to overcome the rejections. Although the claims may be interoperated in light of the specification however the limitations of the specification cannot be relied upon to overcome the rejection.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US patent issued to **Khoury et al (PN. 5, 337,170)** teaches a real time holographic recording process wherein a self pumped photorefractive crystal is used as phase conjugator.

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing

date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Audrey Y. Chang
Primary Examiner
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